UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,594	03/19/2004	Michael A. Kost	ELAN-01184US1	9246

23910 7590 03/17/2009

FLIESLER MEYER LLP
650 CALIFORNIA STREET
14TH FLOOR
SAN FRANCISCO, CA 94108

EXAMINER	
SUTHERS, DOUGLAS JOHN	
ART UNIT	**PAPER NUMBER**
2614	
MAIL DATE	**DELIVERY MODE**
03/17/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/805,594	KOST ET AL.	
	Examiner	Art Unit	
	Douglas J. Suthers	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

djs

DETAILED ACTION

1. The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit 2614.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 27, the claim stages “greater than zero”. It is unclear what units are to be on quantity “zero” (i.e. 0dB, multiply by zero).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5-16, and 18-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oki et al. (US 2001/0010482 A1) in view of Stanley (US 6683494 B2)

2. Regarding claim 1, Oki discloses a system comprising:

a digital amplifier controller (figure 1, items 11, 12, 21, 22, and microcomputer);

an amplifier output stage coupled to the controller and configured to receive audio signals from the controller (Tr11, Tr12, Tr21, Tr22);

one or more sensors coupled to the output stage (figure 9, Comp1); and

one or more low-pass filters coupled to the one or more sensors and configured to receive sensor signals from the one or more sensors (44 and Comp2);

wherein the low-pass filters are configured to filter the sensor signals and to provide the filtered sensor signals to the controller (NG trigger is filtered signal);

wherein the amplifier output stage includes at least two transistors (Tr11, Tr12, Tr21, Tr22); and

wherein the controller is configured to provide a response based on the filtered sensor signals (responds via Sng and Scl signal).

Oki does not disclose selecting one of a plurality of programmable responses wherein one does not turn off any transistors.

Stanley discloses a protection circuit wherein a controller (figure 2, item18) is configured to select one of a plurality of different programmable (18 must be programmed to determine exact response) responses based on sensor signals (right

side inputs); and wherein one or more of the plurality of different programmable responses does not cause a turning off of any of the transistors of the amplifier output stage (column 8 lines 12-23).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the response method of Stanley in the system of Oki. The motivation for doing so would have been avoid problematic situations such as over voltage/current without interrupting signal flow. Therefore, it would have been obvious to combine Stanley with Oki to obtain the invention as specified in claim 1.

3. Regarding claim 2, Oki discloses low pass filtering the sensor signals (via figure 9, items 44 and Comp2).

Stanley discloses wherein one or more sensors comprise at least one current sensor (52) and at least one temperature sensor (80 and 82);

wherein the controller is configured to detect over-current conditions in the output stage based on sensor signals from the at least one current sensor (column 8 lines 12-23);

wherein the controller is configured to detect over-temperature conditions in the output stage based on sensor signals from the at least one temperature sensor (column 8 lines 42-57); and

wherein the programmable response to the filtered sensor signals is selected from the a group of responses that includes compressing at least a portion of the audio

signals without causing a turning off of a transistor of the output stage (column 8 lines 12-23).

4. Regarding claim 3, Oki discloses wherein the controller comprises a pulse width modulation (PWM) controller (figure 1, item 3) and the output stage comprises a PWM output stage (Tr11, Tr12, Tr21, Tr22);

5. Regarding claim 5, Oki discloses further comprising one or more comparators (Comp1), wherein each comparator is coupled to receive an analog sensor signal (voltages) from a corresponding one of the sensors and to generate a binary sensor signal (H:NG) which is provided to a corresponding one of the low-pass filters.

6. Regarding claims 6 and 7, although Oki does not expressly disclose the use of current or heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein the one or more sensors comprise at least one current sensor or at least one temperature sensor.

7. Regarding claim 8, Oki discloses wherein the low-pass filters comprise accumulators (44).

Although Oki does not expressly disclose the claimed accumulator design, the examiner takes official notice that such accumulators were well known in the art and such would have been an obvious design choice. The motivation to use such would have been to more quickly discover faults (for example ones that occur over the boundaries of the m-clock windows). Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to use accumulators that increment and decrement.

8. Regarding claim 9, Oki discloses wherein the filtered sensor signal corresponding to each accumulator is not asserted when a value in the accumulator is below a threshold (n/m) and is asserted when the value in the accumulator is above the threshold (via Comp2).

9. Regarding claim 10, Oki discloses wherein the threshold is programmable (n/m).

10. Regarding claim 11, Oki discloses wherein the controller is configured to receive filtered sensor signals from multiple sensors and to provide responses bases on each of the filtered sensor signals (found in each of items 11, 12, 21, and 22).

11. Regarding claim 12, Oki discloses wherein the controller is configured to detect over-current and over-temperature conditions in the output stage (excessive voltage).

Although Oki does not expressly disclose the use of current or heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein the one or more sensors comprise at least one current sensor and at least one temperature sensor.

12. Regarding claim 13, Oki discloses wherein the programmable response based on the filtered sensor signals comprises compressing at least a portion of the audio signals (output compressed as shown in Figure 3, out1).

13. Regarding claim 25, Oki discloses wherein the controller comprises a pulse width modulation (PWM) controller (figure 1, item 3) and the output stage comprises a PWM output stage (Tr11, Tr12, Tr21, and Tr22);

wherein the system further comprises one or more comparators (figure 9, item Comp1) coupled to receive analog sensor signals (voltages) from corresponding ones of the sensors and configured to generate binary sensor signal (H:NG) which are provided to corresponding ones of the low-pass filters;

each low-pass filter comprises an accumulator (44) configured to not assert the filtered sensor signal when a value in the accumulator is below a programmable

threshold (n/m) and to assert the filtered sensor signal when the value in the accumulator is above the threshold (via Comp2, figure 9);

Regarding claim 26, although Stanley does not expressly disclose the specifics of the temperature sensor, the examiner takes official notice that the claimed types of temperature sensors were well known in the art. The motivation to use such would have been an obvious design choice to realize the circuit. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein the at least one temperature sensor is selected from a group consisting of: a thermal diode; a temperature sensitive resistor; and a temperature sensing integrated circuit.

Regarding claims 27 and 28, although Stanley does not expressly disclose the compression algorithm used, the examiner takes official notice that the claimed amplification structure describes standard definition of a non-limiting compression algorithm which was well known in the art. The motivation to use such would have been to actually realize the needed compression. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise where during the compressing at least a portion of the audio signals: a portion of the audio signals that is below a threshold value is amplified by a first level; and a portion of the audio signals that is above the threshold is amplified by a second level that is below the first level but is greater than zero.

14. Regarding claim 14, Oki discloses a method comprising:

sensing a condition of an audio amplifier output stage (figure 1, voltages across Tr11, Tr12, Tr21, and Tr22), wherein the amplifier output stage includes at least two transistors (Tr11, Tr12, Tr21, Tr22);

providing a sensor output signal corresponding to the sensed condition (figure 9, signal H:NG);

low-pass filtering the sensor output signal to produce a filtered sensor signal (NG trigger is filtered signal);

providing the filtered sensor signal to an audio amplifier controller (items 31, A11, and microcomputer) and

providing a response based on the filtered sensor signal (responds via Sng and Scl signal).

Oki does not disclose selecting one of a plurality of programmable responses wherein one does not turn off any transistors.

Stanley discloses selecting one of a plurality (column 8 lines 12-23 and 42-57) of different programmable (18 must be programmed to determine exact response) responses based on the sensor signal (right side inputs), wherein one or more of the plurality of different programmable responses does not cause a turning off of any of the transistors of the amplifier output stage (column 8 lines 12-23)

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the response method of Stanley in the system of Oki. The motivation for doing so would have been avoid problematic situations such as over voltage/current without interrupting signal flow. Therefore, it would have been obvious to combine Stanley with Oki to obtain the invention as specified in claim 14.

15. Regarding claim 15, Oki discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (figure 1, item 3).

Although Oki does not expressly disclose the use of current sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing the condition of the output stage comprises detecting a current through a transistor of the output stage.

16. Regarding claim 16, Oki discloses further comprising detecting a shoot-through condition in the output stage (excessive voltage).

17. Regarding claim 18, Oki discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (Tr11, Tr12, Tr21, Tr22).

Although Oki does not expressly disclose the use of heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing the condition of the output stage comprises detecting a temperature of a transistor of the output stage.

18. Regarding claim 19, Oki discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (Tr11, Tr12, Tr21, Tr22).

Although Oki does not expressly disclose the use of heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing the condition of the output stage comprises detecting a temperature of a heat sink of the output stage.

19. Regarding claim 20, Oki discloses wherein providing a sensor output signal corresponding to the sensed condition comprises sensing a voltage corresponding to the sensed condition (voltage between source and drain), comparing the voltage to a

reference value and generating a binary signal based upon the comparison (Comp1, paragraph [0046]).

20. Regarding claim 21, Oki discloses wherein low-pass filtering the sensor output signal comprises incrementing and/or decrementing an accumulator (44) based upon the binary signal and generating a signal indicative of whether a value in the accumulator is above or below a threshold value (NG Trigger) associated with the accumulator.

Although Oki does not expressly disclose the claimed accumulator design, the examiner takes official notice that such accumulators were well known in the art and such would have been an obvious design choice. The motivation to use such would have been to more quickly discover faults (for example ones that occur over the boundaries of the m-clock windows). Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to use accumulators that increment and decrement.

21. Regarding claim 22, Oki discloses further comprising modifying the threshold value associated with the accumulator (paragraph [0074]).

22. Regarding claim 23, Oki discloses further comprising processing filtered sensor signals corresponding to multiple sensors through common logic in the controller (through the microcomputer).

23. Regarding claim 24, Oki discloses wherein providing the programmable response based on the filtered sensor signal comprises compressing at least a portion of the audio signals (output compressed as shown in Figure 3, out1).

24. Claims 4 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oki et al. (US 2001/0010482 A1) in view of Bridge (US 6396250 B1).

25. Regarding claim 4, Oki discloses wherein the controller is configured to detect shoot-through current (via excessive voltage).

Although Oki does not expressly disclose the use of current sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing the condition of the output stage comprises detecting a current through a transistor of the output stage.

Oki does not expressly disclose adjusting delays.

Bridge discloses a PWM output stage comprising a controller configured to responsively adjust delays (figure 7, items 720 and 722) between a high-side signal and

a low-side signal (delays driving drivers until system is ok) to minimize the shoot-through current.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the delay control of Bridge in the system of Oki. The motivation for doing so would have been to distribute the maximum power via maximum transistor on time, while insuring no shoot-through current. Therefore, it would have been obvious to combine Bridge with Oki to obtain the invention as specified in claim 17.

26. Regarding claim 17, Oki does not expressly disclose adjusting delays.

Bridge discloses a PWM output stage comprising adjusting relative delays (figure 7, items 720 and 722) between a high-side signal and a low-side signal input to the output stage to minimize shoot-through.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the delay control of Bridge in the system of Oki. The motivation for doing so would have been to distribute the maximum power via maximum transistor on time, while insuring no shoot-through current. Therefore, it would have been obvious to combine Bridge with Oki to obtain the invention as specified in claim 17.

Response to Arguments

Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas J. Suthers whose telephone number is (571)272-0563. The examiner can normally be reached on Monday-Friday 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Douglas Suthers/
Examiner, Art Unit 2614

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2614